Supporting Information for:

Monitoring of Organophosphorus Pesticide Residues in Plant and Vegetable Tissues by a Novel Silver Nanocluster Probe

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Concentration Determination of AgNCs

After dialysis, the as-prepared AgNCs solution (20 mL) was concentrated and freeze-dried to afford the desired AgNCs as a solid powder (0.482 g). Thus, the concentration of AgNCs matrix solution was determinate to be 24 mg/mL.[1-2] In the following experiments, the AgNCs solution was diluted 20 times to 1.2 mg/mL for all the spectrometric analysis and glyphosate detection.

Plant Culture of *Arabidopsis Thaliana* and *Lettuce*

The wild-type seeds of *Arabidopsis thaliana* were surface sterilized and imbibed for 3 days at 4 °C in dark and then sown onto 0.5×Murashige & Skoog (MS) 1.5% (w/v) agar plates. Seedlings were vertically grown on plates in a climate-controlled growth room (22/20 °C day/night temperature, 16/8 h photoperiod). Four-day-old seedlings with healthy roots were used in this study.[3]

Qualitative filter paper was placed into a Petri dish (Φ = 9 cm) and then soaked in 2 mL distilled H_2O. *Lettuce* (*Lactuca sativa*) seeds, purchased from Gansu Academy of Agriculture Science, were transferred to the Petri dish and germinated in a growth chamber at room temperature in the dark. After 48 h, seedlings with similar size were used for all experiments.[4]

XPS Spectrum of the AgNCs

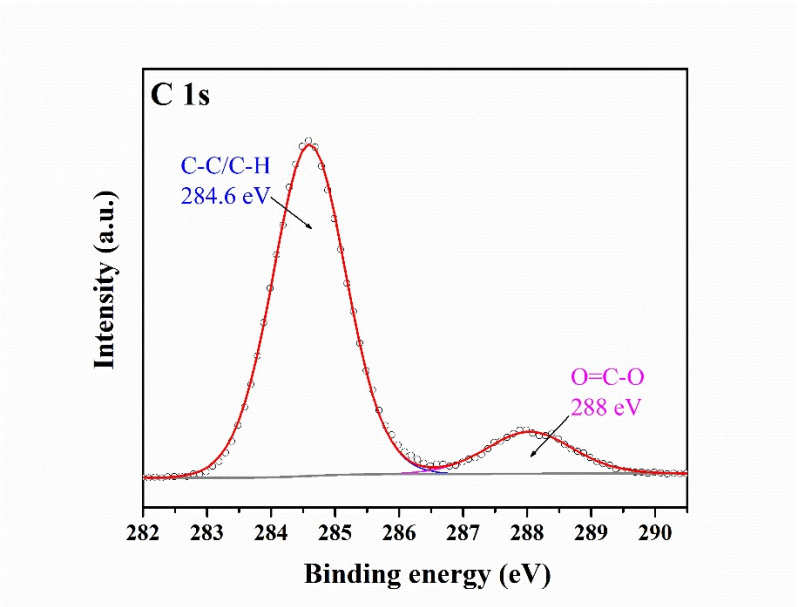

Figure S1. The high-resolution C1s spectrum of AgNCs.

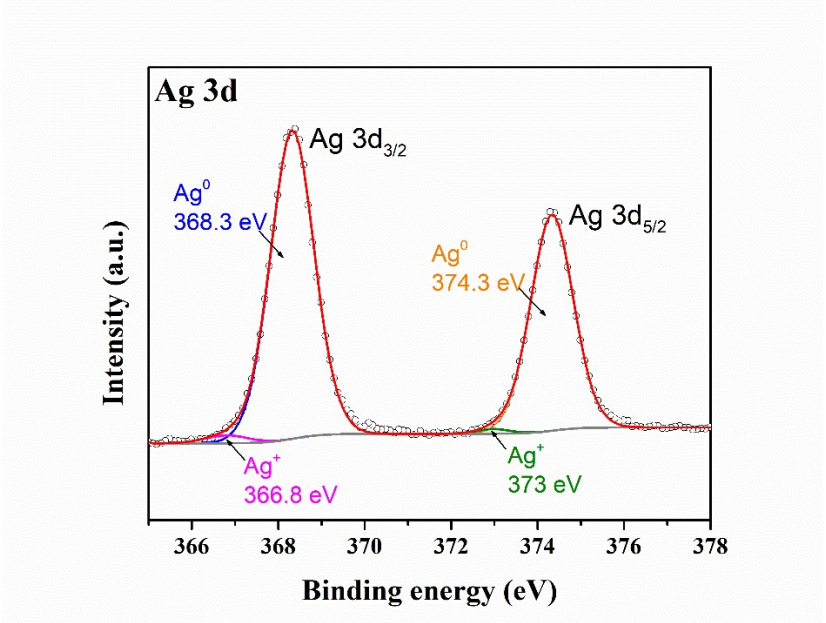

Figure S2. The high-resolution Ag3d spectrum of AgNCs.

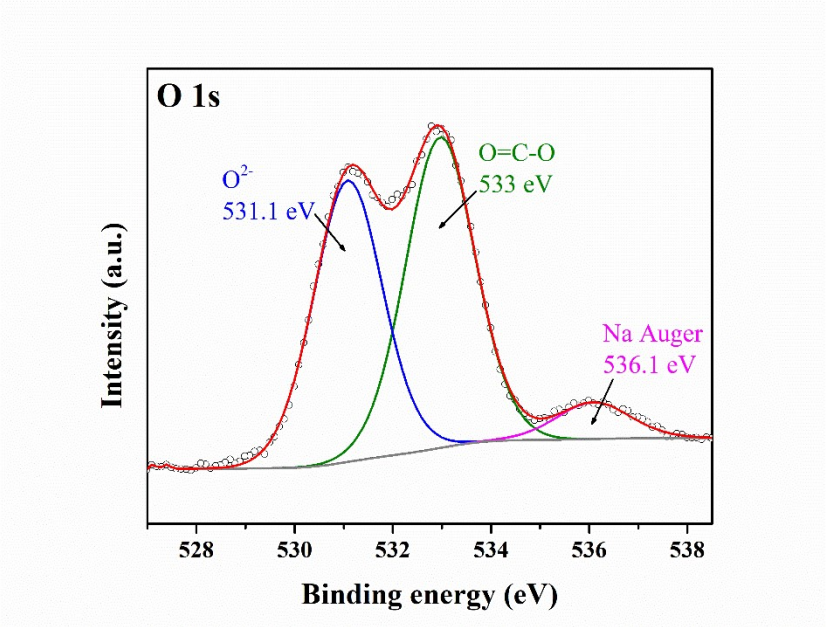

Figure S3. The high-resolution O1s spectrum of AgNCs.

Emission and Absorption Titration Spectra

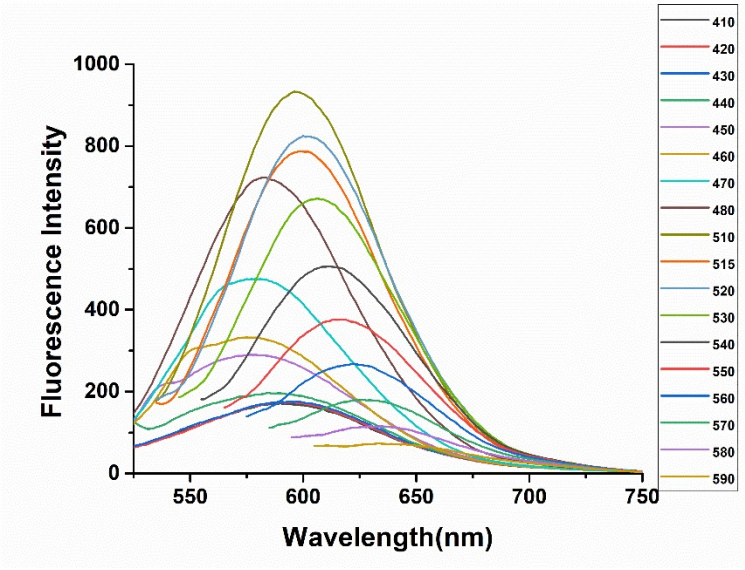

Figure S4. Emission spectra of the AgNCs with different excitation wavelengths from 410 to 590 nm.

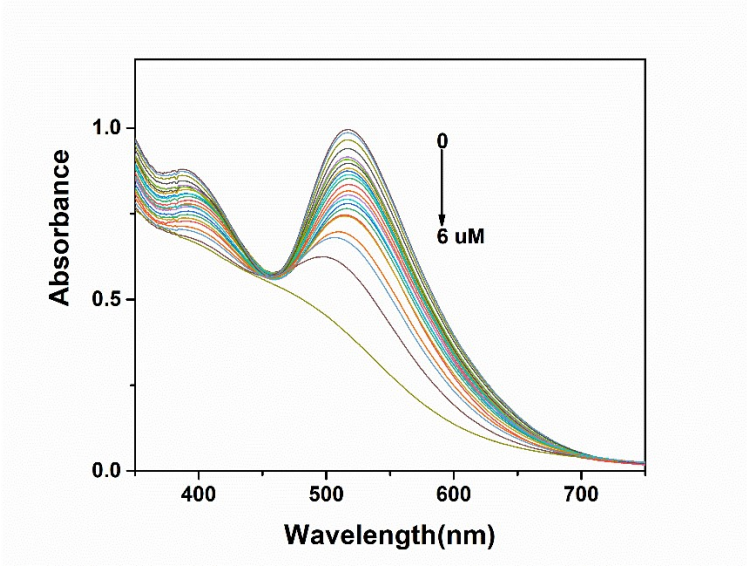

Figure S5. Absorption spectra of the AgNCs (1.2 mg/mL) to glyphosate at varied concentrations (0, 0.25, 0.5, 0.75, 1.0, 1.25, 1.5, 1.75, 2.0, 2.25, 2.5, 2.75, 3.0, 3.25, 3.5, 3.75, 4.0, 4.5, 5.0, 5.5 and 6.0 μM).

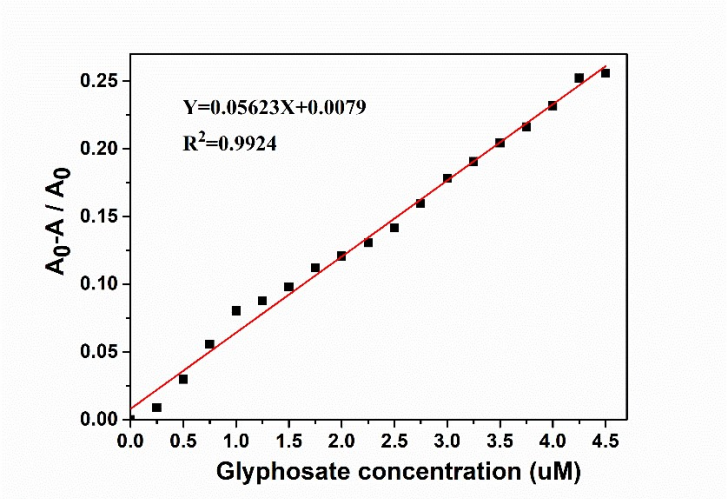

Figure S6. Linear range of absorption titration with different concentration of glyphosate (0, 0.25, 0.5, 0.75, 1.0, 1.25, 1.5, 1.75, 2.0, 2.25, 2.5, 2.75, 3.0, 3.25, 3.5, 3.75, 4.0, 4.25 and 4.5 μM).

Effects of pH

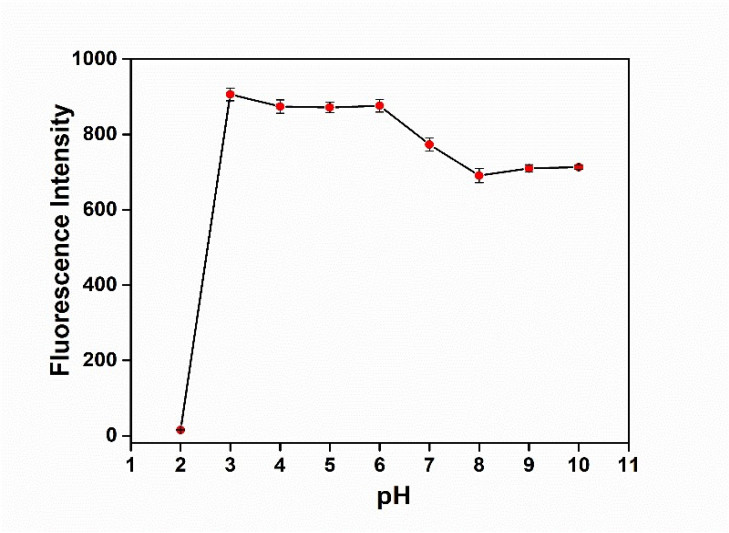

Figure S7. The plot of the fluorescence intensity of the 1.2 mg/mL AgNCs with different pH values.

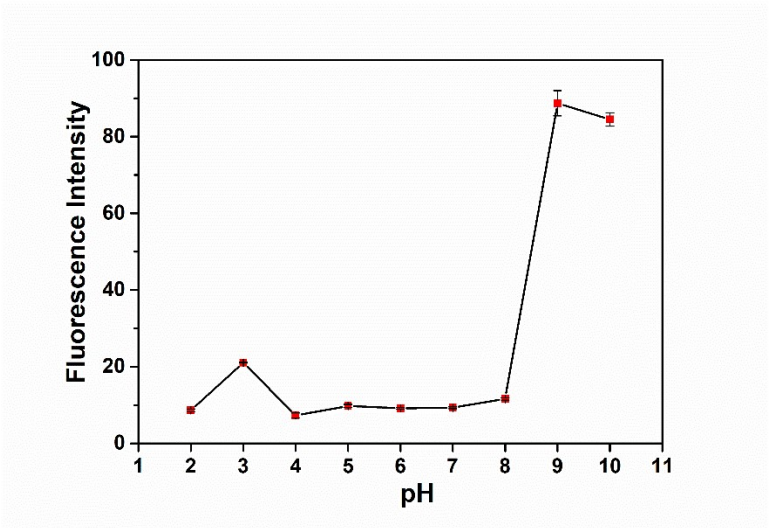

Figure S8. The plot of the corresponding fluorescence intensity of the 1.2 mg/mL AgNCs in the presence of 3 μM glyphosate with different pH values.

Stability of the AgNCs

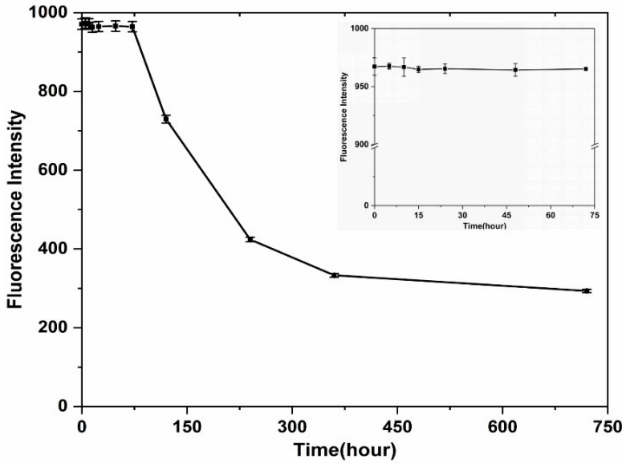

Figure S9. The plot of the corresponding fluorescence intensity of the 1.2 mg/mL AgNCs in complicated condition (containing K^+, Na^+, Ca^{2+}, Mg^{2+} and PO_4^{2-}) at different times.

Selectivity experiment

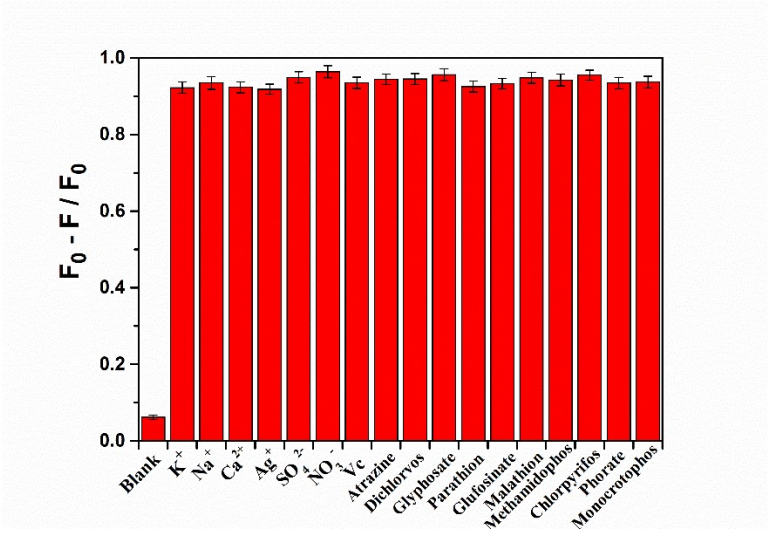

Figure S10. Fluorescence responses of 1.2 mg/mL AgNCs to 3 μM glyphosate in the presence of 10 μM various interferents. Every data point was the mean of three measurements. The error bars are the standard deviation.

Comparison of various glyphosate probes

Table S1

Comparison of various glyphosate probes.

Method/ probe	Response time (min)	Detection limit (μM)	Reference
Coumarin derivative/Cu^{2+}	5	0.11	*Anal. Methods,* 2020, 12, 520.
AuNPs/Pb^{2+}	15	2.4×10^{-3}	*Anal. Methods,* 2017, 9, 2890.
DNA-AgNCs/Cu^{2+}	1	3×10^{-2}	*Food Chem,* 2022, 367, 130617.
Rhodamine B/AuNPs	5	5.9×10^{-4}	*Anal. Chem.,* 2012, 84, 4185.
AuNPs/Cys	15	5.9	*Analyst,* 2019, 144, 2017.
Rhodamine/Cu^{2+}	2	4.1×10^{-3}	*Talanta,* 2021, 224, 121834.
CDs/Cu^{2+}	12	0.095	*RSC Adv,* 2016, 6, 85820.
lgG-CDs	120	0.047	*J. Agric. Food. Chem.,* 2016, 64, 6042.
GMP/Tb@GMP/Eu/DPA	30	41	*Food Chem,* 2020, 323, 126815.
AgNCs based probe	0.5	0.021	this work

Reference

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(4) Yan, Z.; Wang, D.; Ding, L.; Cui, H.; Jin, H.; Yang, X.; Yang, J.; Qin, Bo. *Plant. Physiol. Bioch.* **2015**, *88*, 53-59.